

ABSTRACT OF THE DISCLOSURE

5 A reciprocating pump includes a drive section and a pump section. The drive
section has a reciprocating coil assembly to which alternating polarity control signals are
applied by a reciprocating circuit during operation. A permanent magnet structure of the
drive section creates a magnetic flux field which interacts with an electromagnetic field
produced during application of the control signals to the coil. Depending upon the
polarity of the control signals applied to the coil, the coil is driven in one of two
directions of movement. The reciprocating circuit employs a storage capacitor and
10 several switches to capture the energy of the reciprocating coil as the pump is driven
downwardly. The charge is recycled as the capacitor dissipates, thereby reversing the
polarity of the current through the coil and driving the coil assembly upwardly to its
initial position. A drive member transfers movement of the coil to a pump element which
reciprocates with the coil to draw fluid into a pump chamber and expel the fluid during
15 each pump cycle. The pump is particularly well suited to cyclic pumping applications,
such as fuel injection systems for internal combustion engines.